UNITED STATES PATENT AND TRADEMARK OFFICE

H-A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,128	02/27/2004	Shin-ichi Uehara	Q80097	4671

23373 7590 10/13/2006

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/787,128	UEHARA ET AL.	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28 and 30-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28 and 30-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on August 14, 2006, which has been entered into the file, which has been entered into the file.
- By this amendment, the applicant has amended claims 1-20 and 30-31 and has newly added claim 32.
- Claims 1-28 and 31-32 remain pending in this application.
- The rejection to claims 1-2, 5-12, 21-22, 25, 26 are rejected under 35 U.S.C. 112, first paragraph set forth in the previous Office Action is withdrawn in response to applicant's amendment.

Specification

1. The amendment filed on December 29, 2005 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the amended *equation* with the number "0.000291" that is not **explicitly** stated in the specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

The applicant is respectfully noted that even if "0.000291" equals to "tangent of 1 minute", an explicitly stated of such number in the specification is still needed.

Claim Objections

2. Claims 2, 4, 9-12, 17-20, 22, 24, 26, 28, 31 and 32 are objected to because of the following informalities:

(1). The phrase "0.000291" recited in claims 2 and 4 and **newly added claim 32** is confusing and indefinite since the claims fail to give definition and ***physical meanings*** to the phrase to make the scopes of the claims clear. *The explicit definition needs to be stated in the claims.* The number now being regard as **arbitrary** number. (This objection has already been present in the previous Office Action).

Appropriate correction is required.

3. **Claim 32 (newly submitted) is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.** Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The feature concerning the lens pitch L being equal or less than twice the product of the normal distance OD multiplied by 0.000291 has already been claimed in its based claim 2.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 5-6 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Momochi (PN. 5,528,420) in view of the patent issued to Sandor et al (PN. 5,554,432).

Momochi teaches an *apparatus* for outputting image for stereoscopic vision wherein the apparatus comprises a *display panel* having a *plurality of pixels* forming pixels sections each section including a pixel for displaying image for the right eye and a pixel for displaying image for the left eye respectively, (please see Figures 4 and 5). The apparatus further comprises an *optical unit*, such as the a

lenticular lens consists a plurality of lenses, for re-emitting and refracting image light from the display panel or pixels to *right eye and left eye of an observer*, respectively, (please see Figures 6-8). It is implicitly true that the optical unit will establish a three-dimensional visible *range*, which correspond to a three dimensional region that the left eye of the observer will *only* see the left eye image and the right eye of the observer will *only* see the right eye image.

With regard to the feature having the lens pitch in the optical unit to be *less than* 0.2 mm, recited claims 1 and 30, and the feature concerning the image display can be held in a viewer's hands as recited in claim 30, **Momochi** et al teaches that the lenticular lens could have a width of 200 mm and having a total of 1000 lenticular lenses, which means the pitch for each of the lenticular lenses is 0.2 mm, (please see column 10, lines 31-32). But it does not teach explicitly that the lens pitch is less than 0.2mm. **Sandor** et al in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor** et al to modify the stereoscopic image viewing device of **Momochi** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being **handheld** and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

With regard to the features concerning that the pixels sections are periodically in a first direction, as recited in claims 1 and 31, it is implicitly true that the pixel sections disclosed by Momochi are periodically in the horizontal direction and they are forming left line segment and right line segments.

With regard to the amendment to claims 1 and 30 concerning the optical unit refracting the light emitted from said pixels in different directions, Momochi teaches such explicitly as shown in Figure 4.

With regard to claim 5, Momochi teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claim 6, Momochi teaches that the optical unit is lenticular lens.

6. **Claims 1, 5-8, 21, 25, and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487) in view of the patent issued to Sandor (PN. 5,554,432).**

Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

P = 2l * D/(D+f), (please see equation (1) of column 7), with "2l" denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that, D/(D+f) is always less than one, and the equation can be rewritten as

P< 2l.

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is *a,* then the following equations for the paraxial light beam will have the following equation, e/D = tan (*a*) = l/f', (e is shown in Figure 9). Ichinose et al then teaches that f'=l*D/e, this means:

tan (*a*) = e/D, or e = D* tan (*a*), now l is much less than e.

P < 2l < 2e= 2D* tan (*a*). This means the pitch is determined by the relationship of

P< 2D* tan (*a*).

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

P< 2D* tan (1'), wherein D could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position).

With regard to the feature having the lens pitch in the optical unit to be *less than* 0.2 mm and the feature concerning the image display can be held in a viewer's hands, as recited in claims 30 and 31, **Ichinose** et al does not teach *explicitly* that the lenticular lens has a lens pitch that is less than 0.2mm. However from the **equation above** it is possible to design the stereoscopic image display with a lens pitch less than 0.2 mm. **Sandor** et al in the same field of endeavor teaches a *lenticular lens sheet* having a plurality of cylindrical lenses wherein the lens has a pitch ranged between 150 to 250 lines per inch, or 0.169 to 0.102 mm, (please see column 6, lines 1-7). Sandor et al in particularly teaches that for a small *handheld* lenticular sheet autostereographs lens pitch is required to be as high as 300 lines per inch, which means it has a pitch of 0.08 mm, (please see column 4, lines 36-43). It would then have been obvious to one skilled in the art to apply the teachings of **Sandor** et al to modify the stereoscopic image viewing

device of **Ichinose et al** to make the lenticular lens having lens pitch less than 0.2 mm for the benefit of making the device capable of being made to have a size that is possibly being **handheld** and being applied into portable devices for viewing stereoscopic images in portable and handheld devices.

Ichinose et al further teaches that the pixel sections form *perpendicular line segments* with respect to the **normal** direction of the display panel, (with regard to claims 30 and 31).

With regard to the features concerning the pixels sections are periodically in a first direction, as recited in claims 1 and 30, Ichinose et al teaches the pixels are periodically arranged in horizontal direction, (please see Figures 3-4 and 9).

With regard to the amendment to claims 1 and 30 concerning the optical unit refracting the light emitted from said pixels in different directions, Ichinose et al teaches such explicitly as shown in Figure 9.

With regard to claim 5, Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 6-7, Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claim 8, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 21 and 25, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

7. Claims 2-4, 9-20, 22-24, and 26-28 and newly added claim 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Ichinose et al (PN. 4,987,487).

Ichinose et al teaches a *stereoscopic image display* that is comprised of a *display panel*, (please see Figure 9), having a *plurality of pixel sections* (51) wherein each pixel section includes a *pixel* for displaying image for the right eye and a *pixel* for displaying image for the left eye, (51-an, 51-bn), and an *optical unit* (52) consists a *plurality of lenses* for refracting the image light from the pixels such that the left eye image from the pixels (displaying image for left eye) to reach left eye and right eye image from pixels (displaying image for right eye) to reach right eye only so that three-dimensional vision can be observed, (please see columns 6 and 7). Ichinose et al further teaches that the lenticular lenses has a pitch (P) that is defined by the equation:

P = 2l * D/(D+f), (please see equation (1) of column 7), with "2l" denoting the pitch of the left and right *image pixels*, D being the distance between the lenticular lens to a point in the three dimensional visible region defined by the lenticular lens and the display panel, and f being the focal length of the lenticular lens.

For a definite distance D (such as 500 mm) and a definite focal length (such as 1.56 mm), it is implicitly true that, D/(D+f) is always less than one, and the equation can be rewritten as

P< 2l.

From Figure 9, with simple geometric calculation, one can then determine the pitch as follows:

Assuming the angular separation or angular spread of the image light from one of the pixel making with the normal line is *a,* then the following equations for the paraxial light beam will have the following equation, e/D = tan (*a*) = l/f', (e is shown in Figure 9). Ichinose et al then teaches that f'=l*D/e, this means:

tan (*a*) = e/D, or e = D* tan (*a*), now l is much less than e.

P < 2l < 2e= 2D* tan (*a*). This means the pitch is determined by the relationship of

P< 2D* tan (*a*).

This reference however does not teach that the angular separation to be one minute. However it is known in the art that a general eyesight is 1.0, which means the minimum angular separation, is 1/60 degree or one minute. This then means the pitch is

P< 2D* tan (1'), *wherein D could be either at the minimum distance in the three dimensional visible range or at the optimum viewing position* and **tan(1') takes the value of 0.000291. (This also meets the limitations of the newly added claim 32).**

With regard to the features that the pixels sections are periodically in a first direction, as recited in claims 2, and 4, Ichinose et al teaches that the pixels are periodically in the horizontal direction, (please see Figures 3-4 and 9).

Claims 2 and 4 have been amended to include the feature concerning the optical unit refracting the light emitted from the pixels in different directions, Ichinose et al teaches such explicitly as shown in Figure 9.

The feature recited in claim 2, concerning the perpendicular (or normal distance) distance between the surface of the optical unit and the plane of the viewer's eyes that provides the longest width of the three-dimensional visible range, OD, is included in the distance "D" stated above.

The feature recited in claim 4, concerning the minimum viewing distance "ND" between the surface of the optical unit and the plane of the viewer's eyes is included in the range of distance "D" stated above.

This reference has met all the limitations of the claims. With regard to claims 3 and 4, this reference however does not teach explicitly that the lens pitch assumes the values of 0.124 mm or less or if the distance within the three dimensional visible range, (for either minimum distance or optimum viewing position) to be the ranges of claimed, (i.e., 213 mm or less or 350 mm or less). However, with the **general equations** being defined **by Ichinose et al,** it would have been obvious to one skilled in the art to plug in the desired values to design an image display device satisfies the specific sizes for the benefit of allowing the display devices to be applicable for different application requirements.

With regard to claims 9, 13, and 17 Ichinose et al teaches that pixel sections consists two types of pixels, one for the right eye image and one for the left eye image.

With regard to claims 10-11, 14-15 and 18-19, , Ichinose et al teaches that the optical unit is lenticular lens. Although this reference does not teach explicitly that the optical unit could also be a fly eye lens, however fly eye lens is well known in the art as an alternative lens unit for providing directivity to direct left eye and right eye images to the proper eye respectively. Since fly eye lenses comprise a plurality of convex lenses it also has the advantage of providing parallax views to more than one dimensional. Such modification would then have been obvious to one skilled in the art for the benefit of using a fly eye lenses design to achieve the stereoscopic image display and to allow the image has more than one directional parallax effect.

With regard to claims 12, 16 and 20, Ichinose et al teaches that the display device such as liquid crystal display device can be used in the stereoscopic image display apparatus.

With regard to claims 22-24, and 26-28, Ichinose et al does not teach explicitly that the stereoscopic image display device is used in a portable terminal device including the various devices

claimed. However it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. Ex parte Madham, 2 USPQ2d 1647 (1987).

Response to Arguments

8. Applicant's arguments **filed August 14, 2006** have been fully considered but they are not persuasive. The newly amended claims and newly added claim have been fully considered and rejected for the reasons stated above.

9. In response to applicant's arguments concerning the disagreement of the assertion " that any stereoscopic display device using lenticular screen has inherent property of the claimed "the lens pitch of said optical unit is less than 0.2 mm"" to reject the claims, the examiner respectfully wishes that the applicant would study the reasons for rejection more closely for such assertion is not used to reject the claims. Rather **both cited Momochi and Ichinose references** teach **design equation** for *relating* the pitch of lenticular lens, the pitch of the pixels, and the normal distance between the viewing eye planes and the surface of the lenticular lens, (please see the equation $q-p= \varepsilon= (f*p)/D$ as for Momochi (q being the pitch of the pixels and p being the pixel of the lens and D being the normal distance, and $p= (2*l)*D/(D+f)$, for Ichinose with p being the pitch of the lens and (2l) being the pitch of the pixels and D being the distance between the lenticular lens surface). This means that the pitch of the lenticular lens is closely related to the pitch of the pixels and the viewing distance **in order to provide** the stereoscopic viewing. The cited secondary reference Sandor teaches it is suitable to make the pitch of the lenticular lens to be less than 0.2 mm for a display device with a *handheld size*, (please see column 4 lines 40-45) which gives **a good motivation** for one skilled in the art to ***choice*** the lens pitch to be less than 0.2 mm and to design the pitch of the pixels accordingly (according to the equations) to provide a stereoscopic display device with desired handheld size and desired viewing distance. Applicant's arguments are based

on WRONGFULY reading the reasons for rejection. For the same token, one skilled in the art can use the disclosed design equation to design the desired viewing distances. The applicant is respectfully reminded that it has been held when the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

10. The applicant is respectfully noted that the *geometry* for *allowing* the stereoscopic *image viewing* **which mainly based on the relationship between the pitch of the lenticular lens, the pitch of the pixels and the desired distance of viewing does not** change whether the image is presented on electronic image display or printed image, because they all have "pixels" for presenting the images. Applicant being one skilled in the art **must understand** whether the image light are *emitted* by the pixels, (which also are results of *using* a light source for illuminating them since the pixels themselves cannot emit light even in an electronic image display) or the image light are *reflected* by the pixels by another light source for illuminating them, image light **originated from the pixels** are generated that it is these image light originated from the pixels that provide stereoscopic image display through the lenticular lens. The criterions for providing the stereoscopic image is based on the image light *originated from the pixels*, (please see the Figures in both Momochi and Ichinose) whether they are from the pixels as using a light source illuminating the pixels from behind or using a light source illuminates the pixels from above, the condition is the same. There is **no patentable difference** for using an electronic display **(which is not even being claimed)** or a *printed display* to provide the image light from the pixels. The claims do not even claim a light source, the arguments concerning the location of the light source therefore cannot be relied upon to overcome the rejections. It does not matter either.

11. Applicant is respectfully requested to study the reasons for rejection closely for they explicitly respond to the applicant's arguments concerning the issues related to the claimed subject matters.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.